

Which laser safety course should I do?

Introduction

Opticum Laser Safety partners with edVirtus Professional Education to offer a range of courses encompassing the requirements of AS/NZS IEC 60825.14:2022 and AS/NZS IEC 60825.1:2014. This document is intended to help participants choose the most appropriate course for their needs.

Levels of laser safety competence

In late 2022 Standards Australia published the new edition of the Australian and New Zealand workplace laser safety standard, *AS/NZS IEC 60825.14:2022 Safety of laser products: A user's guide*. Although its role remains unchanged, the new Standard has several changes and improvements over the previous edition. Among the significant changes in relation to training, the 2022 edition has formally introduced the requirements for personnel involved with lasers and laser safety to be “qualified, competent and current” for their required duties. Additionally, it now states that “refresher training should also be given at reasonable intervals”. Finally, the Standard formalises that “Trainers should have knowledge exceeding the level of training being taught”. Section 4.5 of the AS/NZS IEC 60825.14:2022 identifies the following levels of competence in relation to the field of laser safety.

Competence	Description
Laser Protection Advisor	An expert, likely from an external laser safety consulting agency.
Laser Safety Officer (LSO)	Knowledgeable individual should be appointed where class 3B and 4 lasers or levels of radiation are accessible (potentially includes embedded lasers, class 1M and 2M, plus visible class 3R or lower in high-risk environment as well), and is responsible for overseeing laser safety on behalf of employer.
Laser Safety Supervisor (LSS)	An individual with knowledge and responsibility greater than a user but lower than the LSO, responsible for day-to-day safety in a workplace when the LSO is not present. Should have access to the LSO and has duties that include ensuring safety systems are in place and procedures are followed, likely a member of the operating team with user responsibilities as well.
Laser User (or operator)	Those who use, work with, or are placed in control of, potentially hazardous equipment, and are required to carry out tasks safely without putting self or others at risk. Requires competency in operation and use of the equipment for their required duties, but also require formal training in safety aspect of laser use to a commensurate level.
Others with access to laser hazard area	Not specifically involved in operating the lasers but have responsibility for their actions while in the laser hazard area. Have a basic understanding of lasers, appreciate in general terms the extent and function of laser operations in their area, and some understanding of the general issue of laser safety.

It should be noted that the level of responsibility and the duties to be carried out actually distinguish between a LSO and a LSS, i.e. it is typically the role appointed. This is to say that, depending on the duties required by the employer a LSO (i.e. appointed by employer and responsible for safety) for one organisation, e.g. industrial factory, may have a lower skillset than a LSS (i.e. assigned by the LSO to manage day-to-day safety) appointed for a second organisation, e.g. an academic laser research laboratory. The intent of the Standard is that the skillset matches the duties and the title reflects the responsibility of the appointment. For this reason, our laser safety courses refer to the level of the qualification rather than the name of the appointment.

Mapping our courses to the required competencies

To meet the requirements of AS/NZS IEC 60825, we offer courses at the following levels of competence: *Level 1 Laser Safety Course*, *Level 2 Laser Safety Course* and *Level 3 Operator Laser Safety Course*, as summarised in the following tables.

Level 1 Laser Safety Course

This is the most detailed training that we currently offer, and it is intended to provide a thorough qualitative and intermediate quantitative understanding of the principles of laser safety practice to meet the needs of Australian/International laser safety standards. Please follow this link to read more about recent updates to the [Level 1 Laser Safety Course](#) - 2023 update to accommodate the revised 2022 AS/NZS IEC 60825 standard.

Competence	Level 1 Laser Safety Course
Laser Safety Officer (LSO)	<ul style="list-style-type: none"> • Defence Level 1 Laser Safety Officers • Those manufacturing laser product, or integrating laser systems, or classifying or re-classifying, or confirming correct classifications, including confirmation of Standards compliance. • Those required to: <ul style="list-style-type: none"> ○ specify hazard distances, ○ specify safety ratings of filters or eyewear, ○ establish a laser safety program from scratch, and ○ carryout full compliance checks against safety standards. • Those with oversight over several laser workplaces. • Those responsible for approvals of safety plans and accident investigations. • Those responsible for the establishing and managing the safe use of hazardous lasers in an outdoor environment under varying conditions.
Laser Safety Supervisor (LSS)	This course typically maps to the LSO qualification, but for higher complexity laser environments such as manufacturing and research (e.g. universities, R&D organisations) LSS may also require this level of competence for additional autonomy.
Laser User / Other	Not applicable.

Level 1 Laser Safety Course—Delivery Modes

If this is the correct course for you, there are three options for completion of the qualification:

[Level 1 Laser Safety Course – Five-Day](#). This option is suitable for:

- first attempt at qualification, or
- requalification of those not confident in the material or a long time out of the field.

[Level 1 Laser Safety Course – Two-Day Refresher](#). This option is suitable for:

- requalification of those more familiar but wanting some refresher training or confirmation of methodology changes before attempting an exam.

[Level 1 Laser Safety Course – Exam Only](#). This option is suitable for:

- requalification of those who have remained active in the field, have kept current with methodology changes, and are competent and current without refresher training.

Level 2 Laser Safety Course

This training has applicability to most laser workplaces, it is suitable for LSO whose duties don't involve the quantitative assessment of laser hazards or controls, and is also suitable for most LSS, under the purview of either a Level 1 or Level 2 LSO. The course is intended to provide a qualitative level of understanding of the principles of laser safety practice to meet the needs of Australian/International standards for a laser safety. Please follow this link to read more about recent updates to the [Level 2 Laser Safety Course](#) - 2023 update to accommodate the revised 2022 AS/NZS IEC 60825 standard.

Competence	Level 2 Laser Safety Course
Laser Safety Officer (LSO)	<p>Although this course typically maps to the LSS qualification, this course can be suitable for LSO appointment for lower risk or for a smaller ventures where access to external Level 1 or Laser Protection Advisor is available.</p> <ul style="list-style-type: none"> • Defence Level 2 Laser Safety Officers • Those appointed LSO where the duties do not involve quantitative analysis of laser hazards and access to a laser protection advisor or Level 1 LSO is available for such tasks.
Laser Safety Supervisor (LSS)	<ul style="list-style-type: none"> • Those (may be more than one) who are assigned the responsibility for day-to-day laser safety of the laser workplace/facility/laboratory/area where they work, and are the representative of the LSO in the absence of the LSO. • Those who work in manufacturing and research (e.g. universities, R&D organisations), where the tasks or the environment are more dynamic and so a greater level of knowledge or responsibility is placed on users. • Those responsible for the safe use of hazardous lasers in an outdoor environment in a dynamic, public or varying environment needing to implement established safety plans, developed in consultation with a laser protection advisor or Level 1 LSO, on a daily basis to ensure safety before activities commence. • Those generally needing a deeper understanding of laser safety than a user/operator, for example management, project supervisors ultimately responsible for safe work outcomes, or WHS representatives, all of whom have laser areas under their purview.
Laser User / Other	<p>In higher-risk, more-complex environment, with direct beam interaction such manufacturing or research (e.g. universities, R&D organisations) laser users/operators may also be at this level for reduced supervision requirements.</p>

Level 2 Laser Safety Course – Delivery Modes

If this is the correct course for you, there are two options for enrolling:

[Level 2 Laser Safety Course – Two-Day](#). This option is suitable for:

- First attempt at qualification for those new to the field, with a non-laser background or undertaking endeavours traditionally not done with lasers (e.g. laser cleaning, welding applications).
- Those in doubt that they can or want to keep up with the faster pace of the intensive course.
- Those undertaking endeavours traditionally not done with lasers or new to the field who are considering the Level 1 qualification but want a more gradual introduction.

[Level 2 Laser Safety Course – One-Day Intensive/Refresher](#). This option is suitable for:

- First attempt at qualification for those with experience in the field (e.g. previously completed the operator course), have working with lasers in traditional fields under well-established policy.
- First attempt at qualification for those with tertiary education in laser-related discipline working/studying in university laboratory environment.
- Requalification for all who have previously completed our Level 2 Laser Safety Course or equivalent.

Level 3 Laser Safety Course

The standard describes laser users/operators as “those who use, work with, or who are placed in control of [laser] equipment of Class 1M, 2M, 3R, 3B or 4”. In addition to being competent in the use and operation of the equipment they should also have sufficiently detailed safety training, with suggested topics. Our Level 3 Operator Laser Safety Course completely overlaps this suggested content, in addition provides application-based content for a variety of modern laser uses. Please follow this link to read more about recent updates to the [Level 3 Operator Laser Safety Course](#) to accommodate the revised 2022 AS/NZS IEC 60825 standard.

Competence	Level 3 Laser Safety Course
Laser Safety Officer	Not applicable.
Laser Safety Supervisor	Not applicable.
Laser User / Other	<ul style="list-style-type: none"> Defence Level 3 Operators or Maintainers - note laser safety component only. Those who operate potentially hazardous lasers but have no formally assigned role as a LSS or LSO and are operating under appropriate supervision in accordance with established controls and procedures. Those who want an introduction to the field of laser safety and modern laser applications for own development or pending further training.

Level 3 Operator Laser Safety Course – Delivery Modes

If this is the correct course for you, there is one option for enrolling in the [Level 3 Operator Laser Safety Course](#). This option is suitable for first attempt at qualification or for requalification.

Further information on 2023 updates to courses

Level 1 Laser Safety Course - 2023 update

We have restructured our laser safety program to address the changing nature of laser use (i.e. increased penetration of lasers into workplaces that haven't traditionally used lasers) and to better meet the revised recommendations in the Standard to do with training and proficiency. There have been significant changes to the program including the introduction of additional courses.

The Level 1 Laser Safety Course has been revised to reflect the new standard and the current analysis practice, including the existing content plus coverage of the new eyewear standard. Additionally, limited online resources (available to all Level 1 modes) to use in addition the course material to help prepare for the Level 1 exam. The structure for the 5-day course remains the same so that the qualification can be completed in a week.

Since the first day of the 5-day Level 1 Laser Safety Course is the 1-day Level 2 Intensive/Refresher Course, participants who have previously completed a Level 2 Course can use it as prior learning if completed with the last 12 months and (optionally) start the Level 1 Course on day 2.

The exam for the 5-day Level 1 Course has been changed to give participants and additional 4-5 days of preparation and to accommodate our Level 1 refresher options (see below). The default Level 1 exam option for both virtual and face-to-face participants is offered in virtual mode (via a supervised live Microsoft Teams link on Moodle), although a Friday afternoon option is conditionally available upon advance request for face-to-face participants or for in-house courses. The full 5-day Level 1 Course has an included single exam attempt (with one re-exam if needed).

In addition to the revised full 5-day course, to aid with refresher training we are now offering two further options for re-establishment of LSO currency.

- Level 1 2-day Refresher.** The first option is a 2-day Level 1 Refresher course focused solely on the quantitative aspects of the Level 1 laser safety. This course will include an attempt of a Level 1 exam following the course (the Level 2 test must also be completed prior to attempting the Level 1 exam). No re-exam is included.
- Level 1 – Exam Only.** Finally, for those who are confident of both their currency and the proficiency we offer a self-paced revision and exam option. In this case the participant will register for a scheduled exam and will be given access to the course webpage, where they can access limited online resources (available to all Level 1 modes) to use in addition to their own existing material to revise the material prior to attempting the Level 1 exam with those having completed the 2-day Level 1

Refresher course (the Level 2 test must also be completed prior to attempting the Level 1 exam). No re-exam is included.

Course aim

The aim of this Level 1 Laser Safety course is to provide an intermediate quantitative level of understanding of the principles of laser safety practice to meet the needs of Australian/International standards for a laser safety officer or Defence level 1 laser safety officer (LSO1). The first day is our Level 2 Laser Safety Course – 1-day Intensive/Refresher. Days 2-5 then build on this knowledge with a more detailed coverage of the key properties, including mathematical descriptions, of lasers and laser beams. Then through a series of presentations, worked examples followed by tutorial problems this course then gives a more comprehensive quantitative coverage laser safety practice and use of laser safety standards.

Level 2 Laser Safety Course - 2023 update

We have restructured our laser safety program to address the changing nature of laser use (i.e. increased penetration of lasers into workplaces that haven't traditionally used lasers) and to better meet the revised recommendations in the Standard to do with training and proficiency. There have been significant changes to the program including the introduction of additional courses.

The revised Level 2 courses now have two options:

- Level 2 Laser Safety Course – 2-day. The new standard 2-day Level 2 course starts with the new Level 3 operator course on day 1 and then builds on that base knowledge to extend it to the Level 2 qualification on day 2, this allows for a less intensive delivery to facilitate better assimilation of the content. This option is ideally suited for less-experienced first-time attendees.
- Level 2 Laser Safety Course – 1-day Intensive/Refresher. We retain an intensive 1-day Level 2 course for the convenience of experienced personnel and those with a tertiary background in lasers. This intensive one-day version of the Level 2 course is nested at the start of the 5-day Level 1 course. This option is ideally suited for those requiring refresher training at Level 2.

The aim and qualifications obtained for both the standard and the intensive Level 2 courses are the same, although the intensive course requires about 3-4 hours of pre-course preparation for first time (not mandatory for those doing the refresher course) attendees (details provided on registration) and will be delivered at a more intensive pace so is suited to those with a stronger background in lasers and their use. The course aim outline for both options are provided below.

Course aim

The aim of this Level 2 Laser Safety Course is to provide a qualitative level of understanding of the principles of laser safety practice to meet the needs of Australian/International standards for a laser safety supervisor (LSS) or Defence level 2 laser safety officer (LSO2). The course introduces the generation and the characteristics of electromagnetic radiation focusing on optical frequencies, emphasising the differences between conventional light sources and laser sources in relation to their hazard potential. The course looks at workplace safety legislation, and, in particular how it relates to laser use in the various regulatory jurisdictions, identifying how laser safety standards apply. Additionally, the course focusses on the application of specific laser safety standards in the workplace and the requirements for appropriate policies and procedures. The course will emphasise real-world examples, introduce laser safety terminology, the roles of the laser safety personnel, an introduction to the new Australian Standards AS/NZS IEC 60825.1:2014; new AS/NZS IEC 60825.14:2022; and laser safety practice in the workplace.

The Level 2 course provides a non-mathematical treatment of lasers and laser hazards. This course is equivalent to the first day of our 5-day Level 1 course and can be used as a prior learning exemption for the first day of the that course, which is the intensive Level 2 course providing the background necessary for the more detailed and quantitative coverage in the Level 1 course.

Level 3 Operator Laser Safety Course - 2023 update

In late 2022 Standards Australia published the new edition of the Australian and New Zealand workplace laser safety standard, AS/NZS IEC 60825.14:2022 Safety of laser products: A user's guide. The new Standard has several changes and improvements over the previous edition, but its role remains unchanged. Among the significant changes in relation to training, the 2022 edition has formally introduced the requirements for personnel involved with lasers and laser safety to be "qualified, competent and current" for their required duties. The standards describes a laser user/operator as "those who use, work with, or who are placed in control of [laser] equipment of Class 1M, 2M, 3R, 3B or 4". In addition to being competent in the use and operation of the equipment they should also have sufficiently detailed safety training, with suggested topics. Our Level 3 Operator Laser Safety Course completely overlaps this suggested content, in addition provides application-based content for a variety of modern laser uses.

We have restructured our laser safety program to address the changing nature of laser use (i.e. increased penetration of lasers into workplaces that haven't traditionally used lasers) and to better meet the revised recommendations in the Standard to do with training and proficiency. We have enhanced the content and the comprehensibility of our [Level 3 Operator Laser Safety Course](#) to add more practical content and examples for a range of modern applications. This course is also the first day of the 2-day standard Level 2 laser safety course and can be used as prior learning to replace day 1 of that course or in place of the online supplements to the Level 2 1-day Intensive/Refresher course.

Course aim

The aim of this Level 3 Operator Laser Safety course is to provide a non-mathematical introduction to lasers and laser hazards for those using lasers in the workplace to meet the laser safety component for a laser user/operator or Defence level 3 laser operator or maintainer training. The course provides an introduction to laser safety practice, hazard control and regulation of the use of lasers. This course is aimed at personnel who work with or around hazardous lasers or are required to work in a laser hazard area.